(1) Interchange rows 1 and 4;
(2) Multiply row 2 by 4 and add to row 4;
(3) Multiply row 2 by 5 and add to row 3;
(4) Add row 1 to row 2;
(5) Multiply row 2 by 5 and add to row 4;
(6) Multiply row 2 by 7 and add to row 3.

The result is

$$\left\| \begin{array}{cccc|cccc} 1 & 5 & -2 & -1 & 0 & 0 & 0 & 1 \\ 0 & 2 & -1 & -1 & 0 & 1 & 0 & 1 \\ 0 & 0 & 0 & -5 & 0 & 12 & 1 & 7 \\ 0 & 0 & 0 & 0 & 1 & 9 & 0 & 5 \end{array} \right\| .$$

and the solution is $x = \frac{1}{5}$, $y = \frac{9}{5}$, $z = 0$.

If the "5" in the last row and column had come out a zero, the equations would have been inconsistent.

PROBLEMS FOR SOLUTION.

SEND ALL COMMUNICATIONS ABOUT PROBLEMS TO B. F. FINKEL, Springfield, Missouri.

2732. Proposed by PAUL CAPRON, U. S. Naval Academy.

A conical cup, filled with a fluid, stands with the vertex on a smooth horizontal surface. The inner and outer surfaces of the cup are similar cones of revolution, having altitudes h and $h(1+x)$; the ratio of the specific weights of the material of the cone and the fluid is σ; the height of a barometer column of the fluid is h_0. Show that for equilibrium

$$h_0/h(1+x)^2 + \sigma x(1 + x + x^2/3) \not< 2/3.$$

2733. Proposed by J. L. RILEY, Stephenville, Texas.

An ellipse of constant eccentricity passes through the focus of a parabola and has its foci on the curve. Find the envelopes of its axes.

2734. Proposed by E. L. REES, The University of Kentucky.

Given two circles tangent to each other externally. From the extremity of a diameter through the point of tangency, draw a secant such that the segment between the circles shall be equal to a given segment.

2735. Proposed by H. B. PHILLIPS, Massachusetts Institute of Technology.

If two lines AE and BD, drawn from the vertices, A and B, of a triangle to the opposite sides, divide the angles A and B so that the parts of A are respectively less than the corresponding parts of B, then AE is greater than BD.

2736. Proposed by M. COHEN, Freshman, Johns Hopkins University.

Prove by elementary geometry that the orthocenter, the centroid, and the circumcenter of a triangle lie on a line (the Euler line), and that the centroid lies between the other two and is twice as far from the orthocenter as from the circumcenter.